CLAIMS

[1] A cache memory which holds, for each cache entry, order data indicating an access order, and which replaces a cache entry that is oldest in the order, the cache entry holding unit data for caching, said cache memory comprising:

a modification unit operable to modify the order data regardless of an actual access order; and

a selection unit operable to select, based on the modified order data, a cache entry to be replaced.

[2] The cache memory according to Claim 1,

wherein said modification unit includes:

a specifying unit operable to specify a cache entry that holds data which is within an address range specified by a processor; and

an oldest-ordering unit operable to cause the order data of the specified cache entry to become oldest in order, regardless of the actual order.

[3] The cache memory according to Claim 2, wherein said specifying unit has:

a first conversion unit operable to convert a starting address of the address range to a start line address that indicates a starting line within the address range, in the case where the starting address indicates a midpoint in line data;

a second conversion unit operable to convert an ending address of the address range to an end line address that indicates an ending line within the address range, in the case where the ending address indicates a midpoint in the line data; and

a judgment unit operable to judge whether or not there is a cache entry that holds data corresponding to each line address from the start line address to the end line address.

[4] The cache memory according to Claim 3,

wherein said oldest-ordering unit is operable to attach, to the order data, an oldest-order flag which indicates that the access order is oldest.

[5] The cache memory according to Claim 4,

wherein when a cache miss occurs, in the case where a cache entry that has the oldest-order flag attached is present, said selection unit is operable to select the cache entry to be replaced, and in the case where a cache entry that has the oldest-order flag attached is not present, said selection unit is operable to select a cache entry to be replaced in accordance with the order data.

[6] The cache memory according to Claim 5,

wherein the cache entry has, as the order data, a 1-bit order flag that indicates whether the access order is old or new, and

said selection unit is operable to select, to be replaced, the cache entry in which the order flag indicates old, in the case where a cache entry that has the oldest-order flag attached is not present.

[7] The cache memory according to Claim 1,

wherein said modification unit is operable to modify the order data so that one cache entry shows Nth in the access order, and

N is any one of: (a) a number indicating the oldest in the access order; (b) a number indicating the newest in the access order; (c) a number indicating Nth from the oldest in the access order; and (d) a number indicating Nth from the newest in the access order.

[8] The cache memory according to Claim 1, wherein said modification unit has:

an instruction detection unit operable to detect that a

memory access instruction that includes a modification directive for the access order has been executed; and

a rewrite unit operable to rewrite the order data for a cache entry that is accessed due to the instruction.

[9] The cache memory according to Claim 1, wherein said modification unit includes:

a holding unit operable to hold an address range specified by a processor;

a searching unit operable to search for a cache entry that holds data corresponding to the address range held in said holding unit; and

a rewrite unit operable to rewrite the order data so that the access order of the cache entry searched for by said searching unit is Nth in order.

[10] A control method for controlling a cache memory which holds, in each cache entry, order data indicating an access order, and which replaces a cache entry that is oldest in the order, the cache entry holding unit data for caching, said method comprising:

a modification step for modifying the order data regardless of an actual access order; and

a selecting step for selecting, based on the modified order data, a cache entry to be replaced.